PATENT ABSTRACTS OF JAPAN

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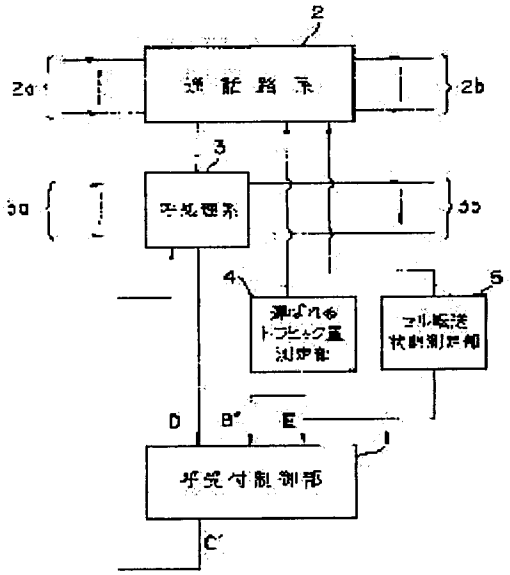
54) ATM CALL RECEPTION CONTROL SYSTEM

57)Abstract:

PURPOSE: To provide an ATM call reception control system for an ATM exchange constructing a communication network of an ATM system which needs no traffic parameter report value from a user and also can flexibly adapt to the change of the external traffic environment of the exchange for improvement of the practicability.

CONSTITUTION: To decide the propriety for reception of calls based on the measurement value of the traffic quantity to be carried and the measurement value of the cell transfer state which are acquired from a message channel system 2 of a switchboard and the simultaneously call connection frequency information acquired from a call processing system 3 of the switchboard for each quality class. Then a threshold value table is retrieved based on the proceding measurement value of the traffic quantity to be carried and the simultaneous call connection frequency information. The acquired cell transfer state threshold value is compared with the cell transfer state measurement value. So that the propriety for reception of calls is decided. Meanwhile the preceding measurement value of the traffic quantity and the call connection frequency information for each quality class are added to a neutral circuit network together wit the cell transfer state measurement value. Then the acquired neural circuit network output is compared with the call reception propriety deciding threshold value to decide the propriety for reception of calls.



CLAIMS

[Claim(s)]
[Claim 1]A call reception control system of an ATM switching system which constitutes a communications network using an ATM method which is provided with the following and characterized by judging call reception propriety, without needing a traffic parameter reported value from a user.
A traffic volume test section which is obtained from a speech channel system of a switchboard, which measures traffic volume carried and which is carried.
A cell transfer state test section which measures cell transfer states which are acquired from a speech channel system of a switchboard, and which are sent out on a usage rate of a corresponding appearance circuit, and a corresponding appearance circuit, such as transfer delay time of a cell, and a cell loss rate.
A call reception control section which judges call reception propriety based on simultaneous call connection number information, said traffic volume measured value carried, and said cell transfer state measured value for every quality classes obtained from a call-processing system of a switchboard.

[Claim 2]By said call reception control section's inputting measured value of said traffic volume carried, and said simultaneous call connection number information for every quality classes, and searching a table based on those values, The ATM call reception control system according to claim 1 which judges call reception propriety by comparing with cell transfer state measured value which acquires a cell transfer state threshold, and into which this is inputted.
[Claim 3]Said call reception control section inputs measured value of said traffic volume carried, and said simultaneous call connection number information for every quality classes, The ATM call reception control system according to claim 1 which judges call reception propriety by measuring a neuron network output which was obtained with cell transfer state measured value into which those values are inputted in addition to a neuron network with a call reception propriety judging threshold which was able to be decided beforehand.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the call reception control system of the ATM switching system which constitutes the communications network which used the ATM (Asynchronous TransferMode) method.
[0002]
[Description of the Prior Art]An ATM method is a method which decomposes into a fixed-length cell and transmits the information on all the media.
Promising ** is carried out as transmission and exchange system of broadband ISDN (Integrated Services DigitalNetwork).
As a call reception control system in the ATM switching system which constitutes the communications network using an ATM method, the method as shown in drawing 4 is known conventionally.
[0003]In drawing 4, it is a speech channel system of an ATM switching system which 41 comes out with a call reception control section, and 42 comes out with the ON circuit group 2a, and accommodates circuit group 2b. 43 is a call-processing system of an ATM switching system which comes out with the conversion item track group 3a, and accommodates the signal wire group 3b. And 44 is a traffic volume test section carried. The call reception control section 41 and the traffic volume test section 44 carried possess the respectively equivalent function to each appearance circuit. Here, paying attention to one certain appearance circuit, the function which the call reception control section 41 and the traffic volume test section 44 carried have is explained.
[0004]The user report traffic parameter value A about the mean velocity and maximum velocity of a call which have been sent via the conversion item track group 3a is applied to the call reception control section 1 via the call-processing system 43. The traffic volume test section 44 carried measures an average, the amount of change, etc. of the whole traffic volume which are carried as for the quality-classes exception on a corresponding appearance circuit via the speech channel system 42. And these ******** traffic volume measured value B measured by the traffic volume test section 44 carried is applied to the call reception control section 41. According to the algorithm beforehand decided based on the applied user report traffic parameter value A and the traffic volume measured value B carried, the call reception control section 41 judges call reception propriety, and returns the call reception propriety signal C to the call-processing system 43.
[0005]
[Problem(s) to be Solved by the Invention]However, when the fault of an above-mentioned ATM call reception control system judges call reception propriety, it is using a user report traffic parameter value. The implementability of the call reception control system on condition of the user report of a traffic parameter value does not necessarily have a high case where it is difficult for a user or a terminal to notify the right value of the maximum velocity of a call, or mean velocity to a net, not few.
[0006]It is what was made in order that this invention might solve the problem of the

conventional technology mentioned above, Instead of using a user report traffic parameter value, cell transfer states, such as an appearance line usage rate and cell transfer quality, are supervised, It aims at judging call reception propriety by whether these values exceeded the threshold, being able to be flexibly adapted also for change of the external traffic environment of a switchboard, therefore providing an ATM call reception control system with high implementability.
[0007]
[Means for Solving the Problem]This invention is characterized by the 1st feature comprising the following.
A traffic volume test section which is obtained from a speech channel system of a switchboard in a call reception control system of an ATM switching system which constitutes a communications network using an ATM method, which measures traffic volume carried and which is carried.
A cell transfer state test section which measures cell transfer states which are acquired from a speech channel system of a switchboard, and which are sent out on a usage rate of a corresponding appearance circuit, and a corresponding appearance circuit, such as transfer delay time of a cell, and a cell loss rate.
A call reception control section which judges call reception propriety based on simultaneous call connection number information, said traffic volume measured value carried, and said cell transfer state measured value for every quality classes obtained from a call-processing system of a switchboard.

[0008]There is the 2nd feature of this invention in preparing beforehand a table which memorized a relation with measured value of traffic volume, and simultaneous call connection number information for every quality classes and a cell transfer state threshold which are carried, and placing it.
[0009]The 3rd feature of this invention inputs measured value of traffic volume and simultaneous call connection number information for every quality classes which are carried, It is in judging call reception propriety by measuring a neuron network output which was obtained with cell transfer state measured value into which those values are inputted in addition to a neuron network with a call reception propriety judging threshold which was able to be decided beforehand.
[0010]
[Function]According to this invention which consists of the above composition, call reception propriety can be judged, without needing the traffic parameter reported value from a user. By inputting the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried, and searching the above-mentioned table based on those values, a cell transfer state threshold is acquired and call reception propriety is judged by comparing with the cell transfer state measured value into which this is inputted. Even when the external traffic environment of a switchboard changes by changing a cell transfer state threshold according to the measured value of traffic volume and the number of simultaneous call connection for every quality classes which are carried, suitable call reception control can be realized. By using a neuron network, table retrieving processing becomes unnecessary and call reception propriety can be judged at high speed. Even if change of the external traffic environment which is not expected by using the learning function of a neuron network arises, suitable call reception control can be made to continue.
[0011]
[Example]Hereafter, the example of this invention is described based on a drawing. Drawing 1 is a lineblock diagram of the ATM call reception control system by the example of this invention. In drawing 1, it is a speech channel system of an ATM switching system which 1 comes out with a call reception control section, and 2 comes out with the ON circuit group 2a, and accommodates circuit group 2b. 3 is a call-processing system of an ATM switching system which comes out with the conversion item track group 3a, and accommodates the signal wire group 3b. And the traffic volume test section to which 4 is carried, and 5 are cell transfer state test sections. The call reception control section 1, the traffic volume test section 4 carried, and the cell transfer

state test section 5 possess the respectively equivalent function to each appearance circuit. Here, paying attention to one certain appearance circuit, the function which the call reception control section 1, the traffic volume test section 4 carried, and the cell transfer state test section 5 have is explained.

[0012]From the call-processing system 3, the simultaneous call connection number information D classified by quality classes on an appearance circuit [/ instead of the user report traffic parameter value A in drawing 1] is added to the call reception control section 1. The traffic volume test section 4 carried measures the average and the amount of change of the whole traffic volume which are carried as for the quality-classes exception on a corresponding appearance circuit via the speech channel system 2. These ******** traffic volume measured value B' measured by the traffic volume test section 4 carried is added to the call reception control section 1.

[0013]The cell transfer state test section 5 measures cell transfer states, such as a usage rate of a corresponding appearance circuit, a cell transfer time delay according to quality classes of the cell on a corresponding appearance circuit, and a waste ratio, via the speech channel system 2. Here, the usage rate of an appearance circuit can be measured by coming out in each measurement section and counting the number of transfer cells on a circuit. A cell transfer time delay can be measured by carrying out the message exchange of the dummy cell for cell transfer time delay measurement in each measurement section. Furthermore, a waste ratio can be measured by counting the number of input signal cells, and the number of abandonment information signal cells in each measurement section. These cell transfer state measured value E measured by the cell transfer state test section 5 is applied to the call reception control section 1. Based on the simultaneous call connection number information D, traffic volume measured value [which is carried] B', and the cell transfer state measured value E which were applied, the call reception control section 1 judges call reception propriety, and returns call reception propriety signal classified by quality classes C' according to quality classes to the call-processing system 3.

[0014]Drawing 2 is an internal configuration figure of the call reception control section 1 of drawing 1. In drawing 2, 6 is a threshold table and 7 is a comparator. It is used in order that the inputted simultaneous call connection number information D and traffic volume measured value B' carried may search the threshold table 6, and the desired cell transfer state threshold F classified by quality classes is acquired as an output of a threshold table. This cell transfer state threshold F and the cell transfer state measured value E are mutually compared by the comparator 7, call reception propriety signal classified by quality classes C' is generated based on that result, and this is returned to the call-processing system 3.

[0015]Drawing 3 is other internal configuration figures of the call reception control section 1. the drawing 3 **** -- as for a comparator, and 11-14, a neuron network and 9 are [a teacher signal deciding part and 16] study data tables temporary memory and 15 a memory and 10 8. The inputted simultaneous call connection number information D and traffic volume measured value B' carried are inputted into the neuron network 8 with the cell transfer state measured value E. In the call reception propriety judging threshold H and the comparator 10 which are accumulated in the memory 9, the neuron network output G according to quality classes is measured. The comparator 10 outputs call reception propriety signal C' of a quality-classes exception based on a comparison result, and this is returned to the call-processing system 3.

[0016]a neuron network -- eight -- an input -- becoming -- simultaneous -- call connection -- number information -- D -- and -- carrying -- having -- traffic volume -- measured value -- B -- ' -- cell transfer -- a state -- measured value -- E -- them -- a neuron network -- eight -- inputting -- having had -- the time -- a call -- reception -- propriety -- a signal -- C -- ' -- respectively -- temporary memory -- 11 - 14 -- temporary -- suspending -- having . When the cell transfer quality after performing a call reception propriety judging has been sent to the call reception control section 1 from the cell transfer state test section 5 as the cell transfer state measured value E, call reception propriety signal C' suspended for the temporary memory 14 and the sent cell transfer quality information E are inputted into the teacher signal deciding part 15. The teacher signal deciding part 15 determines and outputs the teacher signal value J which is a

value which the neuron network 8 should output. That is, the value of call reception propriety signal C' is [call] receivable, and when cell transfer quality is satisfied after that, the teacher signal value J for which call reception is good is outputted.
[0017]The value of call reception propriety signal C' is [call] receivable, and when cell transfer quality is not satisfied after that, or when the value of call reception propriety signal C' is call reception no, the teacher signal value J of call reception no is outputted. Thus, the outputted teacher signal value J is combined with the simultaneous call connection number information D, traffic volume measured value [which is carried] B', and the cell transfer state measured value E which are suspended for the temporary memory 11, 12, and 13, and is accumulated in the study data table 16.
[0018]At the time of study of the neuron network 8, the study input value I corresponding to the simultaneous call connection number information D, traffic volume measured value B' carried, and the cell transfer state measured value E is read from the study data table 16, and is applied to the input side of the neuron network 8. The corresponding teacher signal value J is read from the study data table 16, and, simultaneously with it, is applied to the output side of the neuron network 8. The learned data which became old is deleted from the study data table 16 as abandonment learned data K.
[0019]
[Effect of the Invention]As explained above, according to this invention, call reception control is performed by using the simultaneous call connection number information for every quality classes obtained from the measured value of traffic volume and the measured value of a cell transfer state which are obtained from the speech channel system of a switchboard, and which are carried, and the call-processing system of a switchboard. By judging call reception propriety, without needing the traffic parameter reported value from a user, an ATM call reception control system with high implementability is obtained.
[0020]The table which memorized the relation with the measured value of traffic volume, and the simultaneous call connection number information for every quality classes and the cell transfer state threshold which are carried is prepared beforehand, and is placed. By inputting the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried, and searching a table based on those values, a cell transfer state threshold is acquired and call reception propriety is judged by comparing with the cell transfer state measured value into which this is inputted. Even when the external traffic environment of a switchboard changes by changing a cell transfer state threshold according to the measured value of traffic volume and the number of simultaneous call connection for every quality classes which are carried, suitable call reception control can be realized.
[0021]Call reception propriety is judged by measuring the neuron network output which was obtained with the cell transfer state measured value into which the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried are inputted into, and they are inputted in addition to the neuron network with the call reception propriety judging threshold which was able to be decided beforehand. By using a neuron network, table retrieving processing becomes unnecessary and call reception propriety can be judged at high speed. Even if change of the external traffic environment which is not expected by using the learning function of a neuron network arises, suitable call reception control can be made to continue.

[Translation done.]

TECHNICAL FIELD

[Industrial Application]This invention relates to the call reception control system of the ATM switching system which constitutes the communications network which used the ATM (Asynchronous TransferMode) method.

[Translation done.]

PRIOR ART

[Description of the Prior Art]An ATM method is a method which decomposes into a fixed-length cell and transmits the information on all the media.
Promising ** is carried out as transmission and exchange system of broadband ISDN (Integrated Services DigitalNetwork).
As a call reception control system in the ATM switching system which constitutes the communications network using an ATM method, the method as shown in drawing 4 is known conventionally.
[0003]In drawing 4, it is a speech channel system of an ATM switching system which 41 comes out with a call reception control section, and 42 comes out with the ON circuit group 2a, and accommodates circuit group 2b. 43 is a call-processing system of an ATM switching system which comes out with the conversion item track group 3a, and accommodates the signal wire group 3b. And 44 is a traffic volume test section carried. The call reception control section 41 and the traffic volume test section 44 carried possess the respectively equivalent function to each appearance circuit. Here, paying attention to one certain appearance circuit, the function which the call reception control section 41 and the traffic volume test section 44 carried have is explained.
[0004]The user report traffic parameter value A about the mean velocity and maximum velocity of a call which have been sent via the conversion item track group 3a is applied to the call reception control section 1 via the call-processing system 43. The traffic volume test section 44 carried measures an average, the amount of change, etc. of the whole traffic volume which are carried as for the quality-classes exception on a corresponding appearance circuit via the speech channel system 42. And these ******** traffic volume measured value B measured by the traffic volume test section 44 carried is applied to the call reception control section 41. According to the algorithm beforehand decided based on the applied user report traffic parameter value A and the traffic volume measured value B carried, the call reception control section 41 judges call reception propriety, and returns the call reception propriety signal C to the call-processing system 43.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, according to this invention, call reception control is performed by using the simultaneous call connection number information for every quality classes obtained from the measured value of traffic volume and the measured value of a cell transfer state which are obtained from the speech channel system of a switchboard, and which are carried, and the call-processing system of a switchboard. By judging call reception propriety, without needing the traffic parameter reported value from a user, an ATM call reception control system with high implementability is obtained.
[0020]The table which memorized the relation with the measured value of traffic volume, and the simultaneous call connection number information for every quality classes and the cell transfer state threshold which are carried is prepared beforehand, and is placed. By inputting the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried, and searching a table based on those values, a cell transfer state threshold is acquired and call reception propriety is judged by comparing with the cell transfer state measured value into which this is inputted. Even when the external traffic environment of a switchboard changes by changing a cell transfer state threshold according to the measured value of traffic volume and the number of simultaneous call connection for every quality classes which are carried, suitable call reception control can be realized.
[0021]Call reception propriety is judged by measuring the neuron network output which was obtained with the cell transfer state measured value into which the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried are inputted into, and they are inputted in addition to the neuron network with the call reception propriety judging threshold which was able to be decided beforehand. By using a neuron network, table retrieving processing becomes unnecessary and call reception propriety can be judged at high speed. Even if change of the external traffic environment which is not expected by using the learning function of a neuron network arises, suitable call reception control can be made to continue.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, when the fault of an above-mentioned ATM call reception control system judges call reception propriety, it is using a user report traffic parameter value. The implementability of the call reception control system on condition of the user report of a traffic parameter value does not necessarily have a high case where it is difficult for a user or a terminal to notify the right value of the maximum velocity of a call, or mean velocity to a net, not few.
[0006]It is what was made in order that this invention might solve the problem of the conventional technology mentioned above, Instead of using a user report traffic parameter value, cell transfer states, such as an appearance line usage rate and cell transfer quality, are supervised, It aims at judging call reception propriety by whether these values exceeded the threshold, being able to be flexibly adapted also for change of the external traffic environment of a switchboard, therefore providing an ATM call reception control system with high implementability.

[Translation done.]

MEANS

[Means for Solving the Problem]This invention is characterized by the 1st feature comprising the following.
A traffic volume test section which is obtained from a speech channel system of a switchboard in a call reception control system of an ATM switching system which constitutes a communications network using an ATM method, which measures traffic volume carried and which is carried.
A cell transfer state test section which measures cell transfer states which are acquired from a speech channel system of a switchboard, and which are sent out on a usage rate of a corresponding appearance circuit, and a corresponding appearance circuit, such as transfer delay time of a cell, and a cell loss rate.
A call reception control section which judges call reception propriety based on simultaneous call connection number information, said traffic volume measured value carried, and said cell transfer state measured value for every quality classes obtained from a call-processing system of a switchboard.

[0008]There is the 2nd feature of this invention in preparing beforehand a table which memorized a relation with measured value of traffic volume, and simultaneous call connection number information for every quality classes and a cell transfer state threshold which are carried, and placing it.
[0009]The 3rd feature of this invention inputs measured value of traffic volume and simultaneous call connection number information for every quality classes which are carried, It is in judging call reception propriety by measuring a neuron network output which was obtained with cell transfer state measured value into which those values are inputted in addition to a neuron network with a call reception propriety judging threshold which was able to be decided beforehand.

[Translation done.]

OPERATION

[Function]According to this invention which consists of the above composition, call reception propriety can be judged, without needing the traffic parameter reported value from a user. By inputting the measured value of traffic volume and the simultaneous call connection number information for every quality classes which are carried, and searching the above-mentioned table based on those values, a cell transfer state threshold is acquired and call reception propriety is judged by comparing with the cell transfer state measured value into which this is inputted. Even when the external traffic environment of a switchboard changes by changing a cell transfer state threshold according to the measured value of traffic volume and the number of simultaneous call connection for every quality classes which are carried, suitable call reception control can be realized. By using a neuron network, table retrieving processing becomes unnecessary and call reception propriety can be judged at high speed. Even if change of the external traffic environment which is not expected by using the learning function of a neuron network arises, suitable call reception control can be made to continue.

[Translation done.]

EXAMPLE

[Example]Hereafter, the example of this invention is described based on a drawing. Drawing 1 is a lineblock diagram of the ATM call reception control system by the example of this invention. In drawing 1, it is a speech channel system of an ATM switching system which 1 comes out with a call reception control section, and 2 comes out with the ON circuit group 2a, and accommodates circuit group 2b. 3 is a call-processing system of an ATM switching system which comes out with the conversion item track group 3a, and accommodates the signal wire group 3b. And the traffic volume test section to which 4 is carried, and 5 are cell transfer state test sections. The call reception control section 1, the traffic volume test section 4 carried, and the cell transfer state test section 5 possess the respectively equivalent function to each appearance circuit. Here, paying attention to one certain appearance circuit, the function which the call reception control section 1, the traffic volume test section 4 carried, and the cell transfer state test section 5 have is explained.
[0012]From the call-processing system 3, the simultaneous call connection number information D classified by quality classes on an appearance circuit [/ instead of the user report traffic parameter value A in drawing 1] is added to the call reception control section 1. The traffic volume test section 4 carried measures the average and the amount of change of the whole traffic volume which are carried as for the quality-classes exception on a corresponding appearance circuit via the speech channel system 2. These ******** traffic volume measured value B' measured by the traffic volume test section 4 carried is added to the call reception control section 1.
[0013]The cell transfer state test section 5 measures cell transfer states, such as a usage rate of a corresponding appearance circuit, a cell transfer time delay according to quality classes of the cell on a corresponding appearance circuit, and a waste ratio, via the speech channel system 2. Here, the usage rate of an appearance circuit can be measured by coming out in each measurement section and counting the number of transfer cells on a circuit. A cell transfer time delay can be measured by carrying out the message exchange of the dummy cell for cell transfer time delay measurement in each measurement section. Furthermore, a waste ratio can be measured by counting the number of input signal cells, and the number of abandonment information signal cells in each measurement section. These cell transfer state measured value E measured by the cell transfer state test section 5 is applied to the call reception control section 1. Based on the simultaneous call connection number information D, traffic volume measured value [which is carried] B', and the cell transfer state measured value E which were applied, the call reception control section 1 judges call reception propriety, and returns call reception propriety signal classified by quality classes C' according to quality classes to the call-processing system 3.
[0014]Drawing 2 is an internal configuration figure of the call reception control section 1 of drawing 1. In drawing 2, 6 is a threshold table and 7 is a comparator. It is used in order that the inputted simultaneous call connection number information D and traffic volume measured value B' carried may search the threshold table 6, and the desired cell transfer state threshold F classified by quality classes is acquired as an output of a threshold table. This cell transfer state threshold F and the cell transfer state measured value E are mutually compared by the

comparator 7, call reception propriety signal classified by quality classes C' is generated based on that result, and this is returned to the call-processing system 3.
[0015]Drawing 3 is other internal configuration figures of the call reception control section 1. the drawing 3 **** -- as for a comparator, and 11-14, a neuron network and 9 are [a teacher signal deciding part and 16] study data tables temporary memory and 15 a memory and 10 8. The inputted simultaneous call connection number information D and traffic volume measured value B' carried are inputted into the neuron network 8 with the cell transfer state measured value E. In the call reception propriety judging threshold H and the comparator 10 which are accumulated in the memory 9, the neuron network output G according to quality classes is measured. The comparator 10 outputs call reception propriety signal C' of a quality-classes exception based on a comparison result, and this is returned to the call-processing system 3.
[0016]a neuron network -- eight -- an input -- becoming -- simultaneous -- call connection -- number information -- D -- and -- carrying -- having -- traffic volume -- measured value -- B -- ' -- cell transfer -- a state -- measured value -- E -- them -- a neuron network -- eight -- inputting -- having had -- the time -- a call -- reception -- propriety -- a signal -- C -- ' -- respectively -- temporary memory -- 11 - 14 -- temporary -- suspending -- having . When the cell transfer quality after performing a call reception propriety judging has been sent to the call reception control section 1 from the cell transfer state test section 5 as the cell transfer state measured value E, call reception propriety signal C' suspended for the temporary memory 14 and the sent cell transfer quality information E are inputted into the teacher signal deciding part 15. The teacher signal deciding part 15 determines and outputs the teacher signal value J which is a value which the neuron network 8 should output. That is, the value of call reception propriety signal C' is [call] receivable, and when cell transfer quality is satisfied after that, the teacher signal value J for which call reception is good is outputted.
[0017]The value of call reception propriety signal C' is [call] receivable, and when cell transfer quality is not satisfied after that, or when the value of call reception propriety signal C' is call reception no, the teacher signal value J of call reception no is outputted. Thus, the outputted teacher signal value J is combined with the simultaneous call connection number information D, traffic volume measured value [which is carried] B', and the cell transfer state measured value E which are suspended for the temporary memory 11, 12, and 13, and is accumulated in the study data table 16.
[0018]At the time of study of the neuron network 8, the study input value I corresponding to the simultaneous call connection number information D, traffic volume measured value B' carried, and the cell transfer state measured value E is read from the study data table 16, and is applied to the input side of the neuron network 8. The corresponding teacher signal value J is read from the study data table 16, and, simultaneously with it, is applied to the output side of the neuron network 8. The learned data which became old is deleted from the study data table 16 as abandonment learned data K.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a lineblock diagram of the ATM call reception control system by the example of this invention.
[Drawing 2]It is an internal configuration figure of the call reception control section by this example.
[Drawing 3]They are other internal configuration figures of the call reception control section by this example.
[Drawing 4]It is a lineblock diagram of the ATM call reception control system by conventional technology.
[Description of Notations]
1 and 41 Call reception control section
2 and 42 Speech channel system
2a ON circuit group
2b Appearance circuit group
3 and 43 Call-processing system
3a Conversion item track group
3b Appearance signal wire group
4 and 44 Traffic volume test section carried
5 Cell transfer state test section
6 Threshold table
7 and 10 Comparator
8 Neuron network
9 Memory
11 - 14 temporary memory
15 Teacher signal deciding part
16 Study data table
A User report traffic parameter value
B and B' -- the traffic volume measured value carried
C and C' call reception propriety signal
D Simultaneous call connection number information
E Cell transfer state measured value
F Cell transfer state threshold
G Neuron network output
H Call reception propriety judging threshold
I Study input value
J Teacher signal value
K Abandonment learned data

[Translation done.]

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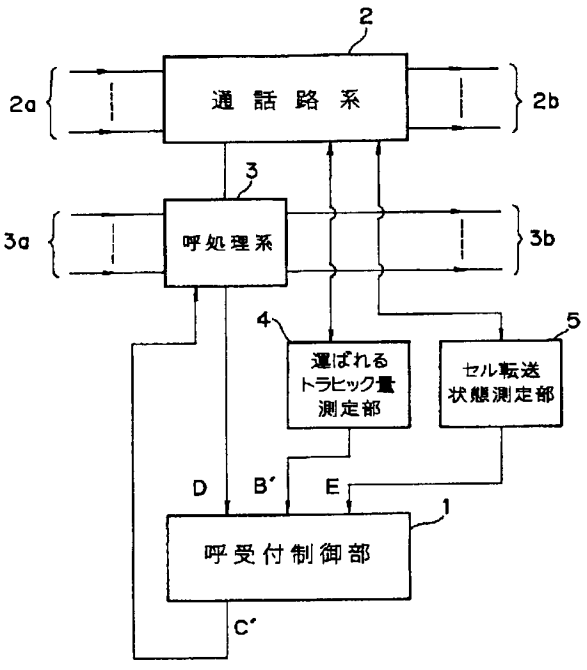
(54)【発明の名称】　ＡＴＭ呼受付制御方式

(57)【要約】

【目的】　ＡＴＭ方式を用いた通信網を構成するＡＴＭ交換機において、ユーザからのトラヒックパラメータ申告値を必要とせず、かつ交換機の外部トラヒック環境の変化にも柔軟に適応が可能であり、従って実現性の高いＡＴＭ呼受付制御方式を提供することを目的とする。

【構成】　本発明は上記目的を達成するために、交換機の通話路系から得られる、運ばれるトラヒック量の測定値及びセル転送状態の測定値と、交換機の呼処理系から得られる各品質クラスごとの同時呼接続数情報を利用して、呼受付可否を判定する。運ばれるトラヒック量の測定値と各品質クラスごとの同時呼接続数情報を基に、閾値テーブルを検索し、得られたセル転送状態閾値をセル転送状態測定値と比較することにより、呼受付可否を判定する。また運ばれるトラヒック量測定値及び各品質クラスごとの同時呼接続数情報を、セル転送状態測定値と共に神経回路網に加え、得られた神経回路網出力を、呼受付可否判定閾値と比較することによって呼受付可否を判定する。



【特許請求の範囲】
【請求項１】　ＡＴＭ方式を用いた通信網を構成するＡＴＭ交換機の呼受付制御方式において、
交換機の通話路系から得られる、運ばれるトラヒック量を測定する運ばれるトラヒック量測定部と、
交換機の通話路系から得られる、対応する出回線の使用率、対応する出回線上へ送出されるセルの転送遅延時間及びセル廃棄率等のセル転送状態を測定するセル転送状態測定部と、
交換機の呼処理系から得られる各品質クラスごとの同時呼接続数情報、前記運ばれるトラヒック量測定値及び前記セル転送状態測定値を基に、呼受付可否を判定する呼受付制御部とからなり、
ユーザからのトラヒックパラメータ申告値を必要とせずに呼受付可否を判定することを特徴とするＡＴＭ呼受付制御方式。
【請求項２】　前記呼受付制御部は、前記運ばれるトラヒック量の測定値及び各品質クラスごとの前記同時呼接続数情報を入力し、それらの値を基にテーブルを検索することにより、セル転送状態閾値を得て、これを入力されるセル転送状態測定値と比較することによって呼受付可否を判定する請求項１記載のＡＴＭ呼受付制御方式。
【請求項３】　前記呼受付制御部は、前記運ばれるトラヒック量の測定値及び各品質クラスごとの前記同時呼接続数情報を入力し、それらの値を入力されるセル転送状態測定値と共に神経回路網に加え、得られた神経回路網出力を、予め決められた呼受付可否判定閾値と比較することによって呼受付可否を判定する請求項１記載のＡＴＭ呼受付制御方式。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、ＡＴＭ（Ａｓｙｎｃｈｒｏｎｏｕｓ　Ｔｒａｎｓｆｅｒ　Ｍｏｄｅ）方式を用いた通信網を構成するＡＴＭ交換機の呼受付制御方式に関する。
【０００２】
【従来の技術】ＡＴＭ方式は、全てのメディアの情報を固定長のセルに分解して転送する方式であり、広帯域ＩＳＤＮ（Ｉｎｔｅｇｒａｔｅｄ　Ｓｅｒｖｉｃｅｓ　Ｄｉｇｉｔａｌ　Ｎｅｔｗｏｒｋ）の伝送及び交換方式として有望視されている。ＡＴＭ方式を用いた通信網を構成するＡＴＭ交換機における呼受付制御方式としては、従来、図４に示したような方式が知られている。
【０００３】図４において、４１は呼受付制御部、４２は入回線群２ａと出回線群２ｂを収容する、ＡＴＭ交換機の通話路系である。また、４３は入信号線群３ａと出信号線群３ｂを収容する、ＡＴＭ交換機の呼処理系である。そして、４４は運ばれるトラヒック量測定部である。なお、呼受付制御部４１と運ばれるトラヒック量測定部４４は各出回線に対してそれぞれ同等な機能を具備している。ここでは、ある出回線１本に着目して、呼受付制御部４１と運ばれるトラヒック量測定部４４の持つ機能を説明する。
【０００４】入信号線群３ａを介して送られて来た呼の平均速度や最大速度に関するユーザ申告トラヒックパラメータ値Ａは、呼処理系４３を経由して、呼受付制御部１へ加えられる。運ばれるトラヒック量測定部４４は、通話路系４２を介して、対応する出回線上の品質クラス別運ばれるトラヒック量全体の平均及び変動量等を測定する。そして、運ばれるトラヒック量測定部４４で測定されたこれら運ばれるトラヒック量測定値Ｂは、呼受付制御部４１へ加えられる。呼受付制御部４１は、加えられたユーザ申告トラヒックパラメータ値Ａと運ばれるトラヒック量測定値Ｂを基に、予め決められたアルゴリズムに従って、呼受付可否の判定を行い、呼受付可否信号Ｃを呼処理系４３へ返す。
【０００５】
【発明が解決しようとする課題】しかしながら、上述のＡＴＭ呼受付制御方式の欠点は、呼受付可否の判定を行う際に、ユーザ申告トラヒックパラメータ値を利用することである。呼の最大速度や平均速度の正しい値をユーザあるいは端末が網へ申告することは困難な場合が少なくなく、トラヒックパラメータ値のユーザ申告を前提とする呼受付制御方式の実現性は必ずしも高くない。
【０００６】本発明は、上述した従来技術の問題点を解決するためになされたもので、ユーザ申告トラヒックパラメータ値を利用する代わりに、出回線使用率やセル転送品質等のセル転送状態を監視し、これらの値が閾値を越えたか否かによって呼受付可否を判定し、かつ交換機の外部トラヒック環境の変化にも柔軟に適応でき、従って実現性の高いＡＴＭ呼受付制御方式を提供することを目的とする。
【０００７】
【課題を解決するための手段】本発明の第１の特徴は、ＡＴＭ方式を用いた通信網を構成するＡＴＭ交換機の呼受付制御方式において、交換機の通話路系から得られる、運ばれるトラヒック量を測定する運ばれるトラヒック量測定部と、交換機の通話路系から得られる、対応する出回線の使用率、対応する出回線上へ送出されるセルの転送遅延時間及びセル廃棄率等のセル転送状態を測定するセル転送状態測定部と、交換機の呼処理系から得られる各品質クラスごとの同時呼接続数情報、前記運ばれるトラヒック量測定値及び前記セル転送状態測定値を基に、呼受付可否を判定する呼受付制御部とからなる。
【０００８】本発明の第２の特徴は、運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報とセル転送状態閾値との関係を記憶したテーブルを、予め準備して置くことにある。
【０００９】本発明の第３の特徴は、運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報

を入力し、それらの値を入力されるセル転送状態測定値と共に神経回路網に加え、得られた神経回路網出力を、あらかじめ決められた呼受付可否判定閾値と比較することによって呼受付可否を判定することにある。

【００１０】

【作用】以上のような構成からなる本発明によれば、ユーザからのトラヒックパラメータ申告値を必要とせずに呼受付可否を判定できる。また運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報を入力し、それらの値を基に上記テーブルを検索することによって、セル転送状態閾値を得て、これを入力されるセル転送状態測定値と比較することにより呼受付可否を判定する。運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数に応じて、セル転送状態閾値を変化させることにより、交換機の外部トラヒック環境が変化した場合でも、適切な呼受付制御が実現できる。更に神経回路網を利用することにより、テーブル検索処理が不要となり、高速に呼受付可否を判定することができる。また神経回路網の学習機能を利用することにより、予期しない外部トラヒック環境の変化が生じても、適切な呼受付制御を継続させることができる。

【００１１】

【実施例】以下、本発明の実施例を図面に基づいて説明する。図１は本発明の実施例によるＡＴＭ呼受付制御方式の構成図である。図１において、１は呼受付制御部、２は入回線群２ａと出回線群２ｂを収容する、ＡＴＭ交換機の通話路系である。また、３は入信号線群３ａと出信号線群３ｂを収容する、ＡＴＭ交換機の呼処理系である。そして、４は運ばれるトラヒック量測定部、５はセル転送状態測定部である。なお、呼受付制御部１と運ばれるトラヒック量測定部４とセル転送状態測定部５は、各出回線に対してそれぞれ同等な機能を具備している。ここでは、ある出回線１本に着目して、呼受付制御部１と運ばれるトラヒック量測定部４、セル転送状態測定部５の持つ機能を説明する。

【００１２】呼処理系３からは、図１でのユーザ申告トラヒックパラメータ値Ａの代わりに、対応する出回線上の品質クラス別同時呼接続数情報Ｄが、呼受付制御部１に加えられる。運ばれるトラヒック量測定部４は、通話路系２を介して、対応する出回線上の品質クラス別運ばれるトラヒック量全体の平均及び変動量を測定する。運ばれるトラヒック量測定部４で測定されたこれら運ばれるトラヒック量測定値Ｂ’は呼受付制御部１に加えられる。

【００１３】またセル転送状態測定部５は、通話路系２を介して、対応する出回線の使用率、対応する出回線上のセルの品質クラス別のセル転送遅延時間、廃棄率等のセル転送状態を測定する。ここで、出回線の使用率は各測定区間内で出回線上の転送セル数をカウントすることにより測定できる。またセル転送遅延時間は各測定区間内でセル転送遅延時間測定用のダミーセルを交換処理することにより測定できる。さらに廃棄率は各測定区間内で入力情報信号セル数と廃棄情報信号セル数をカウントすることにより測定できる。セル転送状態測定部５で測定されたこれらセル転送状態測定値Ｅは、呼受付制御部１に加えられる。呼受付制御部１は、加えられた同時呼接続数情報Ｄ、運ばれるトラヒック量測定値Ｂ’及びセル転送状態測定値Ｅを基に、品質クラス別に呼受付可否の判定を行い、品質クラス別呼受付可否信号Ｃ’を呼処理系３へ返す。

【００１４】図２は図１の呼受付制御部１の内部構成図である。図２において、６は閾値テーブル、７は比較器である。入力された同時呼接続数情報Ｄと運ばれるトラヒック量測定値Ｂ’は、閾値テーブル６を検索するために使用され、閾値テーブルの出力として、所望の品質クラス別セル転送状態閾値Ｆが得られる。このセル転送状態閾値Ｆとセル転送状態測定値Ｅは比較器７で互いに比較され、その結果に基づいて品質クラス別呼受付可否信号Ｃ’が生成され、これが呼処理系３へ返される。

【００１５】図３は呼受付制御部１の他の内部構成図である。図３おいて、８は神経回路網、９はメモリ、１０は比較器、１１～１４は一時メモリ、１５は教師信号決定部、１６は学習データテーブルである。入力された同時呼接続数情報Ｄと運ばれるトラヒック量測定値Ｂ’は、セル転送状態測定値Ｅと共に、神経回路網８へ入力される。品質クラス別の神経回路網出力Ｇは、メモリ９に蓄積されている呼受付可否判定閾値Ｈと比較器１０において比較される。比較器１０は、比較結果に基づいて、品質クラス別の呼受付可否信号Ｃ’を出力し、これが呼処理系３へ返される。

【００１６】神経回路網８への入力となる同時呼接続数情報Ｄ及び運ばれるトラヒック量測定値Ｂ’とセル転送状態測定値Ｅは、それらが神経回路網８へ入力された時の呼受付可否信号Ｃ’と共に、それぞれ一時メモリ１１～１４に一時的に保留される。呼受付可否判定を行った後のセル転送品質が、セル転送状態測定値Ｅとして、セル転送状態測定部５から呼受付制御部１に送られて来た時、一時メモリ１４に保留されている呼受付可否信号Ｃ’と送られて来たセル転送品質情報Ｅが、教師信号決定部１５へ入力される。教師信号決定部１５は、神経回路網８が出力すべき値である教師信号値Ｊを決定し、出力する。すなわち呼受付可否信号Ｃ’の値が呼受付可であり、その後セル転送品質が満足されている時、呼受付可の教師信号値Ｊを出力する。

【００１７】また呼受付可否信号Ｃ’の値が呼受付可であり、その後セル転送品質が満足されていない時、または呼受付可否信号Ｃ’の値が呼受付否である時、呼受付否の教師信号値Ｊを出力する。このようにして出力された教師信号値Ｊは、一時メモリ１１、１２及び１３に保留されている同時呼接続数情報Ｄ、運ばれるトラヒック

量測定値Ｂ’及びセル転送状態測定値Ｅと組み合わされて、学習データテーブル１６に蓄積される。

【００１８】神経回路網８の学習時には、同時呼接続数情報Ｄ、運ばれるトラヒック量測定値Ｂ’及びセル転送状態測定値Ｅに対応する学習入力値Ｉが、学習データテーブル１６から読み出され、神経回路網８の入力側に加えられる。またそれと同時に、対応する教師信号値Ｊが、学習データテーブル１６から読み出されて、神経回路網８の出力側に加えられる。古くなった学習データは、廃棄学習データＫとして、学習データテーブル１６から削除される。

【００１９】

【発明の効果】以上説明したように、本発明によれば、交換機の通話路系から得られる運ばれるトラヒック量の測定値及びセル転送状態の測定値と、交換機の呼処理系から得られる各品質クラスごとの同時呼接続数情報を使用することによって、呼受付制御を行う。ユーザからのトラヒックパラメータ申告値を必要とせずに呼受付可否を判定することにより、実現性の高いＡＴＭ呼受付制御方式が得られる。

【００２０】また、運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報とセル転送状態閾値との関係を記憶したテーブルを、あらかじめ準備して置く。運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報を入力し、それらの値を基にテーブルを検索することによって、セル転送状態閾値を得て、これを入力されるセル転送状態測定値と比較することにより呼受付可否を判定する。運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数に応じて、セル転送状態閾値を変化させることにより、交換機の外部トラヒック環境が変化した場合でも、適切な呼受付制御が実現できる。

【００２１】さらに、運ばれるトラヒック量の測定値及び各品質クラスごとの同時呼接続数情報を入力し、それらを入力されるセル転送状態測定値と共に神経回路網に加え、得られた神経回路網出力を、予め決められた呼受付可否判定閾値と比較することによって呼受付可否を判定する。神経回路網を利用することにより、テーブル検索処理が不要となり、高速に呼受付可否を判定することができる。また神経回路網の学習機能を利用することにより、予期しない外部トラヒック環境の変化が生じても、適切な呼受付制御を継続させることができる。

【図面の簡単な説明】

【図１】本発明の実施例によるＡＴＭ呼受付制御方式の構成図である。

【図２】本実施例による呼受付制御部の内部構成図である。

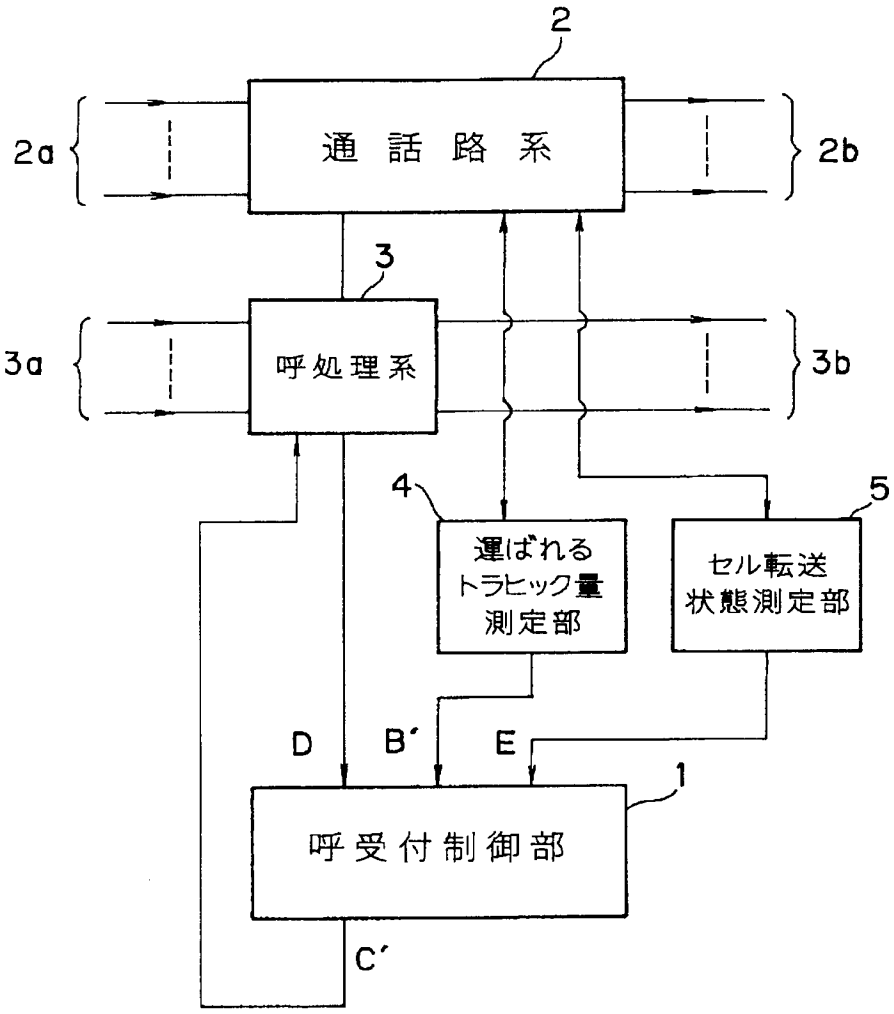
【図３】本実施例による呼受付制御部の他の内部構成図である。

【図４】従来技術によるＡＴＭ呼受付制御方式の構成図である。

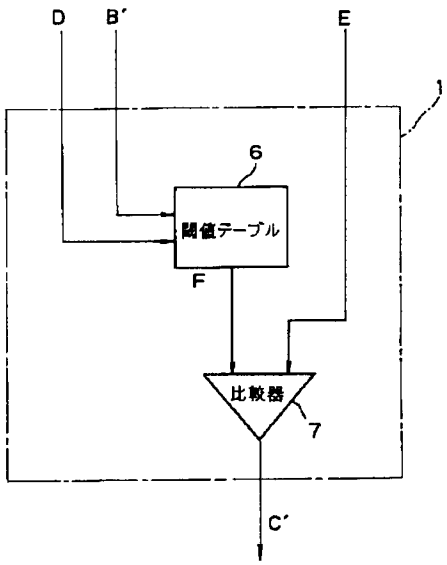
【符号の説明】

１，４１　呼受付制御部
２，４２　通話路系
２ａ　入回線群
２ｂ　出回線群
３，４３　呼処理系
３ａ　入信号線群
３ｂ　出信号線群
４，４４　運ばれるトラヒック量測定部
５　セル転送状態測定部
６　閾値テーブル
７，１０　比較器
８　神経回路網
９　メモリ
１１～１４　一時メモリ
１５　教師信号決定部
１６　学習データテーブル
Ａ　ユーザ申告トラヒックパラメータ値
Ｂ，Ｂ’　運ばれるトラヒック量測定値
Ｃ，Ｃ’　呼受付可否信号
Ｄ　同時呼接続数情報
Ｅ　セル転送状態測定値
Ｆ　セル転送状態閾値
Ｇ　神経回路網出力
Ｈ　呼受付可否判定閾値
Ｉ　学習入力値
Ｊ　教師信号値
Ｋ　廃棄学習データ

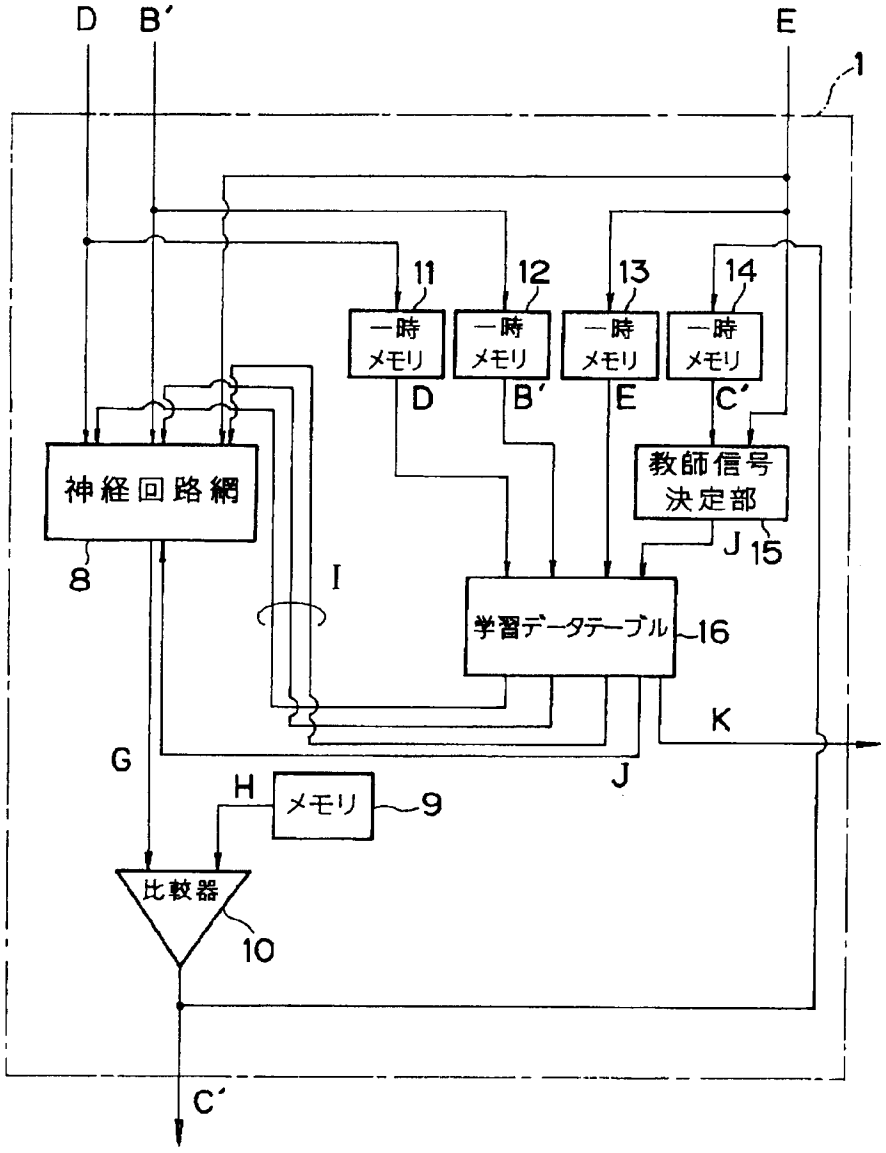
【図１】


2
通話路系
2a
2b
3
呼処理系
3a
3b
4
運ばれる
トラヒック量
測定部
5
セル転送
状態測定部
D
B′
E
1
呼受付制御部
C′

【図２】



【図３】


D
B′
E
1
11
12
13
14
一時メモリ
一時メモリ
一時メモリ
一時メモリ
D
B′
E
C′
神経回路網
教師信号決定部
8
I
J
15
学習データテーブル
16
K
G
J
H
メモリ
9
比較器
10
C′

【図４】